DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY
ACQUISITION LOGISTICS AND TECHNOLOGY
103 ARMY PENTAGON
WASHINGTON DC 20310-0103

REPLY TO
ATTENTION OF

14 MAY 2001

Mr. Michael Bayer
Chair, Army Science Board
2511 Jefferson Davis Highway, Suite 11500
Arlington, Virginia 22202

Dear Mr. Bayer:

I request that the Army Science Board (ASB) conduct a study on "Human-Robotic Interface Issues" as a means of addressing innovative methods for interacting with and controlling semi-automated, and fully automated systems on the battlefield. The study should address, but is not limited to, the Terms of Reference (TOR) described below. Appointed ASB members to this study are to consider the TOR as guidelines and may expand the study to issues considered important to the study. Modifications to the TOR must be addressed with the Chairman of the ASB.

Background:

a. The desire for rapidly deployable forces and the resultant drive towards lightweight mechanized fighting systems places a great premium on survivability by means other than heavy armor. An "ensemble" of manned and unmanned platforms operating cooperatively as an information-network-integrated team could provide the desired levels of survivability. In such a construct, the unmanned platforms could provide at least the following four functions:

(1) Serve as remote (potentially expendable) sensor assets that would support the situation awareness needed to keep the manned platforms out of harm's way.

(2) Semi-automated/fully automated platforms could serve as logistics resupply systems, reducing the number of manned platforms required on the battlefield.

(3) Unmanned platforms could provide communications relay capabilities, to ensure connectivity among dispersed forces.

(4) The scope of unmanned devices may extend to lethal applications, such as indirect fire support or a "robotic wingmen."

b. Depending on the role(s) that unmanned systems play on the battlefield, it is critical for soldiers to efficiently interact with and/or command and control such automated systems. This requirement raises a wide variety of issues ranging from the human factors of display systems, to cognitive models that represent context and shared awareness for collaborative manned/unmanned operations, to control devices that are used to manipulate the robots. Since technology for completely autonomous robots is unlikely until the 2020 timeframe, soldiers would have to either telephone operate the Unmanned Air Vehicle (UAVs) and Unmanned Ground Vehicle (UGVs), or perform supervisory control (i.e., the robots operate autonomously for routine parts of the mission and are telephone operated during critical mission phases).

TOR. The study should be guided by, but not limited to the following TOR:

(1) Examine Army, Defense Advanced Research Projects Agency, Navy, Air Force and National Aeronautical Space Administration UGV and UAV research & development efforts focused on human-machine interfaces, command and control of robots, and supervisory control.

(2) Project technologies and capabilities into the 2015-2020 timeframe, and assess technology voids that may remain.

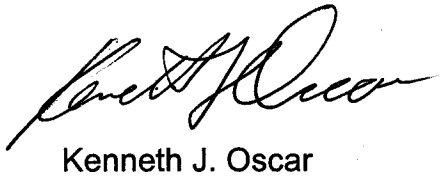
(3) Determine the availability issues for applicable commercial systems and technologies.

(4) Propose (cost-effective) options or strategies for addressing any technology voids identified above.

Study Sponsorship. The sponsor for this study will be the Office of the Assistant Secretary of the Army, Acquisition, Logistics, and Technology.

Study Duration. The study shall be completed by November 2001.

Sincerely,



Kenneth J. Oscar
Acting Assistant Secretary of the Army
(Acquisition, Logistics and Technology)